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EXAMINER	
THOMPSON, JAMES A	
ART UNIT	PAPER NUMBER
2625	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/12/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)
	09/773,147	GESNOT, ARNAUD
	Examiner	Art Unit
	James A. Thompson	2625

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 October 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 January 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

DOUGLAS Q. TRAN
PRIMARY EXAMINER

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 25 October 2006 have been fully considered but they are not persuasive.

Regarding page 7, lines 8-27: Claims 3 and 4, as recited prior to the previous office action (mailed 27 July 2006), and as presently recited simply recite a set of instructions. While the instructions may be for the purpose of having a device perform a series of actions, the instructions themselves are not the actions, nor do the instructions themselves define any structural and functional interrelationship between the instructions and other claimed elements of a computer which permit the computer program's functionality to be realized. Furthermore, the instructions are not necessarily encoded on a computer-readable medium. As presently recited, claims 3 and 4 could also be uncompiled text files containing instructions in a high-level programming language, such as C or FORTRAN, rather than executable computer code encoded on a computer readable medium.

Regarding pages 8-9: The noise suppressed in the image, as taught in Hsieh (US Patent 5,594,767), is different from the noise added to the boundaries of the image in the teachings of Moronaga (US Patent 5,229,864). In Hsieh, the noise that is suppressed is overall image noise (column 6, lines 4-16 of Hsieh). Moronaga teaches a different type of noise. Moronaga teaches added an amount of random noise specifically to the boundary regions so as to reduce distortion. In both Hsieh and Moronaga, operations are performed to reduce the level of edge artifacts, such as aliasing. Furthermore, the random noise added to the edge regions in Moronaga is of a much smaller level than that which is removed from the medical images taught by Hsieh. In Hsieh, the images contain a lot of noise throughout which requires smoothing, enhancement and other processing. In Moronaga, the magnitude of the random noise added is only on the order of 0 to 2 out of 256, and even such a small magnitude of random noise is dependent upon the level of block activity (column 12, lines 36-45 of Moronaga). Thus, the random noise added according to the teachings of Moronaga does not adversely affect the image data and is quite different from the much larger level of naturally occurring noise which is suppressed by the system taught in Hsieh.

Finally, there is a clear motivation to combine Hsieh and Moronaga set forth in the Moronaga reference itself since adding random noise helps to eliminate distortions of the block (region) contours in the resultant image (column 11, lines 16-20 of Moronaga).

Regarding page 10: Claims 2-4 cannot be considered allowable merely due to their dependency from claim 1 since, as demonstrated above, claim 1 would clearly have been obvious to one of ordinary skill in the art at the time of the invention. Newly added claims 5-20 have been fully considered and are addressed in detail in the prior art rejections set forth below.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. **Claims 3-4 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.** Claims 3 and 4 each recite a computer program product comprising a set of instructions. As such, claims 3 and 4 are simply computer program listings, such as an uncompiled text file containing instructions in a high-level programming language, and do not define any structural and functional interrelationship between the computer program and other claimed elements of a computer which permit the computer program's functionality to be realized. A computer program listing does not by itself produce any concrete, tangible and useful result, and is therefore non-statutory.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsieh (US Patent 5,594,767) and Moronaga (US Patent 5,229,864).**

Regarding claim 1: <u>Hsieh discloses</u> a method comprising:

- low pass filtering an input signal (figure 4(60) and column 4, lines 34-40 of Hsieh) to provide a filtered signal that includes filtered samples (column 4, lines 36-40 of Hsieh).

- determining a correction ("enhancement" in Hsieh) area (figure 4(62-64); column 4, lines 41-45; and column 5, lines 20-26 of Hsieh) by computing mask values ("edge only" or difference image data) based on the filtered samples (figure 4(62) and column 4, lines 35-46 of Hsieh).
- enhancing the filtered samples belonging to the correction area (figure 4(68) and column 6, lines 4-11 of Hsieh) to produce therefrom an output signal (column 6, lines 11-16 of Hsieh – the resultant image is the output signal).

Hsieh does not disclose expressly adding a random value to the filtered samples belonging to said correction area.

Moronaga discloses adding a random value to input samples (figure 12(302) and column 12, lines 50-56 of Moronaga).

Hsieh and Moronaga are combinable because they are from the same field of endeavor, namely correcting and enhancing digital image data based on digital image data region characteristics. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to add random values to the input samples, as taught by Moronaga, wherein the input samples are the filtered samples taught by Hsieh. This would necessarily occur since in Hsieh the image data is first low-pass filtered in order to generate smoothed image data (column 4, lines 34-37 of Hsieh). The motivation for doing so would have been that adding a small amount of random noise, as taught by Moronaga, helps to eliminate distortions of the block (region) contours in the resultant image (column 11, lines 16-20 of Moronaga). Therefore, it would have been obvious to combine Moronaga with Hsieh to obtain the invention as specified in claim 1.

6. **Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsieh (US Patent 5,594,767), Moronaga (US Patent 5,229,864), and Suzuki (US Patent 5,907,370).**

Regarding claim 2: Hsieh discloses:

- the mask values are equal to the difference between the smoothed (low-pass filtered) image data and the original input image data (column 4, lines 41-46 of Hsieh). Thus, the difference image data corresponds to the bits of lower significance since the difference between the smoothed image data and the original image data will naturally be small, and therefore in the bits of lower significance. If not, then the smoothed image data could not properly be considered "smoothed" since the difference between the smoothed image data and the original image data would be great.
- the low-pass filtering is applied around block boundaries (column 4, lines 40-46 of Hsieh).

Hsieh and Moronaga do not disclose expressly multiplying the input samples by a power of 2 to provide a modified signal comprising modified samples of m-bit binary numbers, said low-pass filtering being applied to the modified signal, said determining includes computing mask values equal to the m-n least significant bits of the filtered samples where n is the number of bits of the input sample, and said adding includes adding the random value to the filtered samples to provide corrected samples and dividing the corrected samples by the power of 2 when the mask values are different from zero to provide the output signal.

Suzuki discloses:

- multiplying the input samples by a power of 2 (via adding bits) to provide a modified signal comprising modified samples of m-bit (10-bit) binary numbers (figure 7 and column 5, lines 46-56 of Suzuki). By adding two bits of "0" to the least significant bits, the input signal is multiplied by a factor of 4. For example, the 8-bit binary number 11011011 (219 in decimal) becomes the 10-bit binary number 1101101100 (876 in decimal).
- said filtering is applied to the modified signal (column 6, lines 11-15 of Suzuki).
- computing mask values (figure 6(S4) of Suzuki) equal to the m-n least significant bits of the filtered samples (column 6, lines 29-38 of Suzuki) where n is the number of bits (8 bits) of the input sample (column 5, lines 49-56 of Suzuki). The two least significant bits of the 10-bit filtered sample are used to control the output of the converter (column 6, lines 29-38 of Suzuki), thus performing the function of masking for the converter.
- the filtered samples are divided by the power of 2 (figure 9B(center pixel) and column 11, line 66 to column 12, line 7 of Suzuki), which results in the output signal (column 12, lines 8-17 of Suzuki). The input signal is multiplied by 4, as shown above, and then filtered by a low-pass filter. Afterwards, a post filter (figure 15(39) of Suzuki) is applied in order to mitigate image deterioration (column 11, line 66 to column 12, line 4 of Suzuki). The post filter is the same filter as the initial low-pass filter shown in figure 9B of Suzuki (column 12, lines 4-7 of Suzuki). The input sample under consideration is the center pixel, which is multiplied by a factor of 1/4 (column 6, line 64 to column 7, line 3 of Suzuki). Thus, the filtered sample is divided by the same power of 2 as the input sample was multiplied by earlier.

Hsieh and Moronaga are combinable with Suzuki because they are from similar problem solving areas, namely the interpolation and filtering of digital input signal data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to apply the input sample bit increase, filtering, and masking set forth in Suzuki to the filtering, edge detection, and random number adding

taught by the combination of Hsieh and Moronaga. Since the random number is added to the filtered samples when the mask values are different from zero (since the correction area is defined as where the mask values are non-zero), as taught by the combination of Hsieh and Moronaga in the arguments regarding claim 1 above, then said random number would be added to the filtered samples thus providing corrected samples, as taught by Hsieh and Moronaga, and said corrected samples would be divided by the power of 2, as taught by Suzuki, when the mask values are different from zero to provide the output signal, as taught by Hsieh and Moronaga. The motivation for doing so would have been to mitigate image degradation due to quantization (column 3, lines 48-52 of Suzuki). Therefore, it would have been obvious to combine Suzuki with Hsieh and Moronaga to obtain the invention as specified in claim 2.

7. **Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsieh (US Patent 5,594,767), Moronaga (US Patent 5,229,864), and Nakaya (US Patent 6,295,376 B1).**

Regarding claim 3: The arguments regarding claim 1 are incorporated herein. Hsieh discloses a computer program product that comprises a set of instructions that, when loaded, carries out the method of claim 1 (figure 2(36) and column 3, lines 58-64 of Hsieh). Since a computer (figure 2(36) of Hsieh) is used to perform the image processing operations (column 3, lines 58-64 of Hsieh), a computer program product comprising a set of computer-executable instructions is inherent.

Hsieh and Moronaga do not disclose expressly that said computer program product is loaded into a television receiver.

Nakaya discloses installing an image processing device into a television receiver (column 12, lines 15-17 of Nakaya).

Hsieh and Moronaga are combinable with Nakaya because they are from the same field of endeavor, namely video image data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to install the computer program product of Hsieh and Moronaga into a television receiver and use said computer program product for said television receiver, as taught by Nakaya. The motivation for doing so would have been to have the computer programming product in a device that is capable of receiving and displaying digital image data (column 12, lines 27-31 of Nakaya). Therefore, it would have been obvious to combine Nakaya with Hsieh and Moronaga to obtain the invention as specified in claim 3.

Regarding claim 4: The arguments regarding claim 1 are incorporated herein. Hsieh discloses a computer program product that comprises a set of instructions that, when loaded, carries out the method of claim 1 (figure 2(36) and column 3, lines 58-64 of Hsieh). Since a computer (figure 2(36) of Hsieh) is

used to perform the image processing operations (column 3, lines 58-64 of Hsieh), a computer program product comprising a set of computer-executable instructions is inherent.

Hsieh and Moronaga does not disclose expressly that said computer program product is loaded into a set-top-box.

Nakaya discloses installing an image processing device into a set top box (column 12, lines 21-23 of Nakaya).

Hsieh and Moronaga are combinable with Nakaya because they are from the same field of endeavor, namely video image data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to install the computer program product of Hsieh and Moronaga into a set top box and use said computer program product for said set top box, as taught by Nakaya. The motivation for doing so would have been to have the computer programming product in a device that is capable of receiving and displaying digital image data (column 12, lines 27-31 of Nakaya). Therefore, it would have been obvious to combine Nakaya with Hsieh and Moronaga to obtain the invention as specified in claim 4.

8. **Claims 5-16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gibson (US Patent 5,253,043) in view of Moronaga (US Patent 5,229,864).**

Regarding claim 5: Gibson discloses receiving an input signal (figure 1(30-33) and column 6, lines 56-65 of Gibson); up-scaling the input signal to provide a scaled input signal (figure 1(45) and column 7, lines 37-39 of Gibson); low-pass filtering the scaled input signal to provide a filtered signal (figure 1(46) and column 7, lines 39-40 of Gibson); combining a value (color correction) to the filtered signal to provide a corrected signal (column 7, lines 48-58 of Gibson); and down-scaling the corrected signal to provide an output signal (figure 1(59); and column 8, lines 9-13 and lines 25-28 of Gibson).

Gibson does not disclose expressly defining correction regions in the filtered signal; that said value is combined within the correction regions; and that said combined value is a random value.

Moronaga discloses defining correction regions in an input video signal (column 4, lines 11-18 of Moronaga - interblock regions that need to be corrected for distortion); and adding a random value to input samples (figure 12(302) and column 12, lines 50-56 of Moronaga).

Gibson and Moronaga are combinable because they are from the same field of endeavor, namely correcting and enhancing digital image data based on digital image data region characteristics. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to define a correction region, and add random values to input samples, as taught by Moronaga. By combination with

Gibson, the input samples would be the filtered signal. The motivation for doing so would have been that adding a small amount of random noise, as taught by Moronaga, helps to eliminate distortions of region contours in the resultant image (column 11, lines 16-20 of Moronaga). Furthermore, defining a correction region and combining the value within said region allows the random noise addition, along with other correction processes, to be performed where the correction processes are needed. rather than globally. Locally processing the image based on the defined regions provides improved results since processes which help in one region of an image may not work well in other regions of an image. Therefore, it would have been obvious to combine Moronaga with Hsieh to obtain the invention as specified in claim 5.

Further regarding claim 6: Moronaga discloses that the input signal includes blocks of data (figure 4 and column 4, lines 22-31 of Moronaga); and the correction regions correspond to edges of the blocks of data (column 4, lines 11-21 of Moronaga).

Further regarding claim 7: Moronaga discloses that the blocks of data correspond to an area of an image (column 4, lines 22-31 of Moronaga); and the edges correspond to a perimeter of the area (column 4, lines 11-21 of Moronaga – edges of the image blocks).

Further regarding claim 8: Moronaga discloses that the edges correspond to a defined band about the perimeter of the area (column 4, lines 11-21 of Moronaga – edges of the image blocks).

Further regarding claims 9 and 10: Moronaga discloses that the correction regions depend on values of the filtered signals (column 4, lines 26-39 of Moronaga).

Regarding claim 11: Gibson discloses that a scale of the output signal corresponds to a scale of the input signal (column 7, lines 37-39 and column 8, lines 25-28 of Gibson). Both upscaling and downscaling are performed using a factor of four for the signals that are low-pass filtered. Thus, the scale of the output signal corresponds to a scale of the input signal.

Regarding claims 12 and 14: Gibson discloses that the upscaling includes upscaling by a power of two (column 7, lines 44-47 of Gibson).

Further regarding claims 13 and 15: Moronaga discloses that the correction regions correspond to values of the filtered signal that are not multiples of the power of two (figures 5-6 and column 4, line 57 to column 5, line 30 of Moronaga). The selection of the interblock filter, and thus the correction regions, corresponds to the level of interblock distortion, and not multiples of the power of two. Interblock distortion is simply based on the level of difference between two blocks of an image, and does not specifically correspond to multiples of the power of two.

Regarding claim 16: Gibson discloses that the input signal corresponds to a video signal (figure 1(30) and column 6, lines 54-56 of Gibson).

Regarding claim 19: Gibson discloses that upscaling includes upscaling by a power of four (column 7, lines 37-40 of Gibson).

9. **Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gibson (US Patent 5,253,043) in view of Moronaga (US Patent 5,229,864) and well-known prior art.**

Regarding claim 17: Gibson in view of Moronaga does not disclose expressly that the video signal corresponds to a decoded MPEG-encoded signal.

Official Notice is taken that a video signal corresponding to a decoded MPEG-encoded signal is old, well-known and expected in the art. At the time of the invention, one of ordinary skill in the art would be motivated to use a decoded MPEG-encoded signal as the video signal since such a video signal is a standard video format that can be readily manipulated.

Further regarding claim 18: Moronaga discloses that the correction regions correspond to perimeter regions (edges) of the blocks of data (column 4, lines 11-21 of Moronaga).

Gibson in view of Moronaga does not disclose expressly that the video signal includes area blocks of a decoded MPEG-encoded signal.

Official Notice is taken that a video signal including area blocks of a decoded MPEG-encoded signal is old, well-known and expected in the art. Video signals are divided into area blocks when encoded in an MPEG format. At the time of the invention, one of ordinary skill in the art would be motivated to use a decoded MPEG-encoded signal as the video signal since such a video signal is a standard video format that can be readily manipulated.

10. **Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gibson (US Patent 5,253,043) in view of Moronaga (US Patent 5,229,864) and obvious engineering design choice.**

Further regarding claim 20: Moronaga discloses that the random noise is limited to values of 0, ±1 and ±2 (column 12, lines 38-41 of Moronaga).

While Gibson in view of Moronaga does not discloses expressly that the random noise is limited to values of 0 and 1, it would have been an obvious engineering design choice to limit the random noise to values of 0 and 1. The random noise used to help reduce interblock distortion (column 12, lines 54-56 of Moronaga) must necessarily be small compared with the value range of the input signal (in this case 0~255). Thus, limiting the random noise to values of 0 and 1 would be useful in certain cases, such as images with a low to moderate level of interblock distortion.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Thompson whose telephone number is 571-272-7441. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on 571-272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

02 January 2007

DOUGLAS Q. TRAN
PRIMARY EXAMINER

James A. Thompson
Examiner
Technology Division 2625